SYSTEMS AND METHODS FOR SCHEDULING REOCCURRING DELIVERIES AND PICKUPS

CROSS REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Application Serial No. 60/311,701, filed August 10, 2001, and entitled "Re-Occurring Pickup and Delivery System."

FIELD OF THE INVENTION

This patent relates generally to delivery scheduling systems, and more particularly to systems for scheduling reoccurring deliveries and pickups.

BACKGROUND OF THE INVENTION

In the past, when a business wanted to schedule a shipment of goods from one of its suppliers, the business would have to contact the supplier over the phone or by mail to request that a shipment be made within certain preferred blocks of time on certain specified days. For example, the business might request that a shipment be made on Monday, July 19, between 1:00pm and 5:00pm, or on Tuesday, July 20, between 9:00am and 12:00pm. The supplier would then enter this order into a mainframe-based routing-and-scheduling program for processing. Later, the various orders would be processed along with other orders in a batch to determine when the various orders would actually be delivered. The business would then be informed as to whether the delivery would be made at one of the specified preferred times, or at some other time. Thus, there was a

delay between the time that the business placed the order and the time that a delivery time for the order was confirmed.

Computer systems have now been developed that allow customers to schedule deliveries in real-time over the Internet. These systems generally allow users to schedule deliveries, one at a time, by selecting a time window in which the delivery is to be made from one or more available time windows.

One example of such a system is Webvan's Internet-based scheduling system for home grocery delivery. When using this system, a customer logs on to Webvan's website and then selects a date on which the customer wishes to have groceries delivered to their home. The system then identifies any time windows that are available for the customer's requested date and immediately displays a list of available and unavailable time windows on the customer's display screen. After the customer selects an available time window, the system instantly schedules a delivery to be made within the selected time window. If desired, the customer may schedule additional deliveries by repeating this process.

More specifically, when using the Webvan system, a user might request, for example, that a particular delivery be made on September 28, 2001. In response, the system may indicate, for example, that it only has the capacity to make the requested delivery within the following time windows on September 28: (1) 9:00am–10:00am; (2) 11:00am–12:00pm; and (3) 2:00pm–3:00pm. In one example, the user might request that the delivery be made within the 9:00am–10:00am time window. In response, the system will instantly confirm that the particular delivery will be made on September 28 between 9:00am and 10:00am.

One disadvantage of current on-line, real-time delivery scheduling systems is that such systems require a customer to schedule each delivery individually. As a result, while these systems work well for customers (such as on-line bookstore customers) who place orders that vary in content and delivery time, these systems are not particularly convenient for users who wish to have the same delivery made on a periodic basis. For example, if a customer wishes to have the same set of items delivered to their home every other Thursday, the customer must re-schedule the delivery once every two weeks. This is undesirable because it requires the customer to spend an often significant amount of

time regularly re-scheduling the order. In addition, real-time prior art systems do not allow the customer to reserve a series of delivery times in advance. Thus, because the customer has to reserve each delivery time within a series of deliveries individually, the customer must compete with other customers for each individual delivery time within the series. As a result, no customer can be sure that they will be able to schedule each delivery within a series of deliveries according to a set, periodic schedule.

In addition to allowing users to schedule deliveries, at least one prior art delivery scheduling program allows users to request that items be picked up from a business on a specified day. For example, U.S. Patent 5,616,899 to *Recigno* teaches a scheduling system that allows a user to specify dates on which orders for dental appliances are to be picked up from various dental offices. However, like the early delivery scheduling systems discussed above, the *Recigno* system is not capable of functioning in a real time environment. Rather, to schedule a pickup, users must call a central dispatching center and request that a particular pickup be made at a preferred time on a preferred day. The user's request is then presumably entered into an offline system and the requested pickup is scheduled at a later time, presumably by hand or by using a standard off-line scheduling system. Although customers' delivery preferences are considered during scheduling, these preferences are presumably often overridden by other considerations, such as a deliverer's ability to make a pickup at a requested time.

Recigno teaches allowing a user to enter a standing request that a repeating series of pickups be made regularly on certain specified days. Thus, for example, a user may request that items be picked up from the user's offices on a weekly basis. When a user wishes to request that a pickup be made according to such a repeating schedule, the user manually enters the request into a "Pickup/Delivery Preferences" Box on a "Schedule Pickup/Delivery" input screen **194** such as the screen shown in Figure 17A of *Recigno*. While this functionality is not described in detail in the application, it is presumed that such requests are processed offline by hand or by a standard offline routing and scheduling system. Accordingly, it is understood that users' requests that a pickup be made on a recurring basis are often accepted, but not satisfied, by the *Recigno* system.

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Accordingly, one significant disadvantage of the *Recigno* system is that it provides no immediate feedback to users as to whether the system will be able to make any particular pickup within a requested series of pickups. Thus, for example, the system may allow a user to request that a pickup be made every Wednesday, even if no delivery trucks will be available to make a pickup for the next seven Wednesdays. In such a situation, even if the user properly requested that the pickup be made every Wednesday, the system would actually schedule the first seven pickups within the series of requested pickups to be made on days other than Wednesday. While such a system may be acceptable for scheduling pickups from commercial establishments that generally have employees available to assist with pickups during regular business hours (and that can, therefore, tolerate unpredictable variances in pickup schedules), such a system would not be useful for scheduling time-sensitive pickups from less tolerant customers, such as residential customers.

Thus, in light of the above, there is a need in the art for an improved delivery scheduling system that allows a user to schedule, in real time, two or more delivery vehicle visits (such as pickups or deliveries) in response to a single request. Preferably, such a system would allow the user to at least tentatively confirm the scheduled delivery vehicle visits upon scheduling the delivery vehicle visits, and would inform the user in advance if a particular delivery vehicle visit must be rescheduled.

SUMMARY OF THE INVENTION

The present invention provides an improved scheduling system that allows a user to schedule, in real time, two or more delivery vehicle visits (or, more broadly speaking, customer visits) in response to a single request. As described in detail below, this system allows the user to at least tentatively confirm the scheduled delivery vehicle visits upon scheduling the delivery vehicle visits, and informs the user in advance if a particular delivery vehicle visit must be rescheduled. A first preferred embodiment of the present invention accomplishes this by providing a system and method for: (1) receiving a single request from a user that a first delivery vehicle visit (e.g., a delivery or pickup of items) be made to the customer within a particular time window on a first day, and that a second

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delivery vehicle visit be made to the customer within the particular time window on a second day; (2) determining whether to schedule the first delivery vehicle visit within the particular time window on the first day; (3) determining whether to schedule the second delivery vehicle visit within the particular time window on the second day; (4) in response to a combination of receiving the request and determining that the first delivery vehicle visit should be scheduled within the particular time window on the first day, scheduling the first delivery vehicle visit to be made within the particular time window on the first day; and (5) in response to a combination of receiving the request and determining that the second delivery vehicle visit should be scheduled within the particular time window on the second day, scheduling the second delivery vehicle visit to be made within the particular time window on the second day. Preferably, Steps (1) – (6) above are performed in real time, and the system displays a confirmation message immediately after scheduling the first and second deliveries.

In a preferred embodiment of the invention, the system determines whether to schedule a particular delivery vehicle visit within a particular time window based upon whether it would be both possible and economically desirable to make the delivery vehicle visit within the particular time window. In a further preferred embodiment of the invention, the first and second delivery vehicle visits are both deliveries, and the second delivery includes substantially all of the items delivered in the first delivery. In this embodiment of the invention, the single request referenced above comprises: (1) a definition of the first set of items; (2) an indication that the first set of items should be delivered within the particular time window on the first day; and (3) an indication that the first set of items should be delivered, according to a reoccurring delivery schedule, within the particular time window on at least one day other than the first day.

A second preferred embodiment of the invention comprises a system and method for: (1) identifying a time window in which it would be possible for a delivery service to make a delivery vehicle visit to a customer on a particular day; (2) allowing a user to request that the delivery service make a first delivery vehicle visit to the customer within the time window; (3) allowing the user to specify that the user wishes to schedule a periodic series of delivery vehicle visits that includes the first delivery vehicle visit and

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one or more additional delivery vehicle visits, each delivery vehicle visit within the series to be made on a different day, but within the particular time window; (4) allowing the user to specify a schedule for the series of delivery vehicle visits; (5) scheduling the first delivery vehicle visit; (6) using a first set of scheduling information to determine whether to tentatively schedule each of the additional requested delivery vehicle visits; and (7) in response to determining, based on the first set of scheduling information, to tentatively schedule each of the additional requested delivery vehicle visits, tentatively scheduling each of the additional requested delivery vehicle visits. In a preferred embodiment of the invention, the above steps are executed in real time.

In a further preferred embodiment of the invention, the system is configured for allowing the user to define the periodic series of delivery vehicle visits by defining, within a single display window, a periodic relationship between each of the additional requested delivery vehicle visits and the first delivery vehicle visit. The system is also preferably configured for automatically specifying that substantially all of the items delivered in a first delivery should also be delivered during at least one additional requested delivery.

In an additional preferred embodiment of the invention, the system is configured for performing the steps of: (1) using a second set of scheduling information to determine whether to firmly schedule a particular one of the additional requested delivery vehicle visits; and (2) in response to determining, based on the second set of scheduling information, to firmly schedule the particular one of the additional delivery vehicle visits, firmly scheduling the particular one of the additional requested delivery vehicle visits. The system preferably performs the above steps as part of a periodic scheduling job that the system executes close to the date of the particular delivery vehicle visit. While executing this periodic scheduling job, the system preferably performs the steps of: (1) determining whether any of the additional requested delivery vehicle visits is tentatively scheduled to be made within a particular date range; (2) in response to determining that at least one of the additional requested delivery vehicle visits is tentatively scheduled to be made within the particular date range, using the second set of scheduling information to determine whether to firmly schedule the at least one of the additional requested delivery

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vehicle visits; and (3) in response to determining, based on the second set of scheduling information, to firmly schedule the at least one of the additional requested delivery vehicle visits, firmly scheduling the at least one of the additional requested deliveries.

In a preferred embodiment of the invention, the first and second sets of scheduling information referenced above preferably include information regarding previously scheduled series of delivery vehicle visits, previously scheduled one-time delivery vehicle visits, and the days on which the delivery service will not make delivery vehicle visits.

In a further preferred embodiment of the invention, if the system determines, based on the second set of scheduling information, not to firmly schedule a particular vehicle visit, the system automatically informs a user (for example, by e-mail, voice mail, or instant messaging) that the delivery vehicle visit must be rescheduled. In this embodiment of the invention, the system allows the user to electronically re-schedule a delivery vehicle visit (for example, by e-mail or via a website) if the delivery service is unable to make the visit.

Another preferred embodiment of the invention comprises a system and method for scheduling delivery vehicle visits to a customer. The system is configured for performing the steps of: (1) receiving a request from a user that a first delivery vehicle visit be made to the customer on a first day within a first time window, and that a second delivery vehicle visit be made to the customer on a second day within a second time window; (2) determining whether to schedule the first delivery vehicle visit to be made on the first day within the first time window; (3) determining whether to schedule the second delivery vehicle visit to be made on the second day within the second time window; (4) in response to a combination of: (a) the request, and (b) a determination in Step (2) that the first delivery vehicle visit should be scheduled within the first time window on the first day, scheduling the first delivery vehicle visit to be made within the first time window on the first day; and (5) in response to a combination of: (a) the request, and (b) a determination in Step (3) that the second delivery vehicle visit should be scheduled within the second time window on the second day, scheduling the second delivery vehicle visit to be made within the second time window on the second day. In this embodiment of the invention, the step of determining whether to schedule the second

delivery vehicle visit within the second time window on the second day includes determining whether a lag time between the first time window and the second time window is greater than a predetermined threshold lag time. In a preferred embodiment of the invention, the steps above are executed in a real time computing environment.

A further preferred embodiment of the invention comprises a system and method for scheduling delivery vehicle visits by a delivery service to a customer. This system is configured for performing the steps of: (1) identifying a first time window in which it would be possible for the delivery service to make, on a first day, a first delivery vehicle visit to the customer; (2) allowing a user to request that the delivery service make the first delivery vehicle visit to the customer on the first day within the first time window; (3) allowing the user to specify a second day on which a second delivery vehicle visit is to be made, the second delivery vehicle visit being related to the first delivery vehicle visit; (4) identifying a second time window in which it would be possible for the delivery service to make a delivery vehicle visit to the customer on a second day, the step of identifying including the step of determining whether a lag time between the first time window and the second time window is greater than a threshold lag time; (5) allowing the user to request that the delivery service make the second delivery vehicle visit to the customer on the second day within the second time window; (6) scheduling the first delivery vehicle visit to be made to the customer on the first day within the first time window; and (7) scheduling the second delivery vehicle visit to be made to the customer on the second day within the second time window. In a preferred embodiment of the invention, the steps above are executed in a real time computing environment.

In a preferred embodiment of the invention, the first delivery vehicle visit is a pickup; and the second delivery vehicle visit is a delivery. More specifically, the first delivery vehicle visit is preferably a pickup of a load of laundry to be cleaned; and the second delivery vehicle visit is a delivery of the load of laundry that should be scheduled to be made after the load of laundry has been cleaned. Accordingly, in a preferred embodiment of the invention, the predetermined threshold lag time referenced above is determined based, at least in part, on the estimated time that it would take to clean the laundry.

A further preferred embodiment of the invention comprises a system and method for scheduling customer visits to a customer. A customer visit is defined as a visit to a customer to perform a service, such as picking up items from the customer, delivering items to the customer, or both picking items up from and delivering items to the customer. Such a service may also include a service to be performed at the customer's residence, such as maintenance work or work related to the installation of a product for the customer (e.g., installation of cable TV service). Such a service may also include work that needs to be performed according to a periodic schedule, such as lawn maintenance or pool cleaning.

In this embodiment of the invention, the system is configured for performing the steps of: (1) receiving a single request from a user that a first customer visit be made to the customer within a particular time window on a first day, and that a second customer visit be made to the customer within the particular time window on a second day; (2) determining whether to schedule the first customer visit within the particular time window on the first day; (3) determining whether to schedule the second customer visit within the particular time window on the second day; (4) in response to a combination of: (a) the request, and (b) a determination in Step (2) that the first customer visit should be scheduled within the particular time window on the first day, scheduling the first customer visit to be made within the particular time window on the first day; and (5) in response to a combination of: (a) the request, and (b) a determination in Step (3) that the second customer visit should be scheduled within the particular time window on the second day, scheduling the second customer visit to be made within the particular time window on the second day. In a preferred embodiment of the invention, Step (2) above includes the step of determining whether it would be possible to make the first customer visit within the particular time window on the first day. Furthermore, Step (3) preferably includes determining whether it would possible to make the second customer visit within the particular time window on the second day.

A further preferred embodiment of the invention also comprises a system and method for scheduling customer visits to a customer. This system is configured for performing the steps of: (1) receiving a request from a user that a first customer visit be

made to the customer on a first day within a first time window, and that a second customer visit be made to the customer on a second day within a second time window; (2) determining whether to schedule the first customer visit to be made on the first day within the first time window; (3) determining whether to schedule the second customer visit to be made on the second day within the second time window; (4) in response to a combination of: (a) the request, and (b) a determination in Step (2) that the first customer visit should be scheduled within the first time window on the first day, scheduling the first customer visit to be made within the first time window on the first day; and (5) in response to a combination of: (a) the request, and (b) a determination in Step (3) that the second customer visit should be scheduled within the second time window on the second day, scheduling the second customer visit to be made within the second time window on the second day; and wherein Step (3) of determining whether to schedule the second customer visit within the second time window on the second day includes determining whether a lag time between the first time window on the first day and the second time window on the second day is greater than a predetermined threshold lag time.

Yet another preferred embodiment of the invention comprises a system and method for scheduling customer visits to a customer, the system being configured for performing the steps of: (1) identifying a time window in which it would be possible to make a customer visit to the customer on a particular day; (2) allowing a user to request that the customer visit be made to the customer within the time window on the particular day; (3) allowing the user to specify that the user wishes to schedule a periodic series of customer visits that includes the first customer visit and one or more additional customer visits, each customer visit within the periodic series to be made on a different day, but within the particular time window; (4) allowing the user to specify a schedule for the series of customer visits; (5) scheduling the first customer visit; (6) using a first set of scheduling information to determine whether the delivery service can make each of the additional requested customer visits; and (7) in response to determining that, based on the first set of scheduling information, the delivery service can make each of the additional requested customer visits, tentatively scheduling each of the additional requested customer visits.

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Additional embodiments of the invention include a computer-readable medium that includes computer-executable instructions for executing the various steps that the systems and methods described above are configured to perform.

BRIEF DESCRIPTION OF THE DRAWINGS

Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. 1 is a block diagram of a system according to a preferred embodiment of the current invention.

FIG. 2 is a block diagram of a Scheduling Server according to a preferred embodiment of the current invention.

FIGS. 3A – 3C depict a flowchart that generally illustrates a primary scheduling module according to a preferred embodiment of the current invention.

FIGS. 4A and 4B depict a flowchart that generally illustrates a secondary scheduling module according to a preferred embodiment of the current invention.

FIGS. 5A-5C depict a flowchart that generally illustrates a first alternative embodiment of a scheduling module according to a preferred embodiment of the current invention.

FIGS. 6A-6E are graphic illustrations of a scheduling window according to a preferred embodiment of the current invention.

FIGS. 7A-7B are graphic illustrations of a confirmation window according to a preferred embodiment of the current invention.

FIGS. 8A-8B are graphic illustrations of a scheduling window according to an alternative embodiment of the current invention.

FIGS. 9A–9D depict a flowchart that generally illustrates a second alternative embodiment of a scheduling module according to a preferred embodiment of the current invention.

FIG. 10 is a graphic illustration of an exemplary home page of a system according to a preferred embodiment of the current invention.

FIG. 11 is a graphic illustration of an order entry screen according to a preferred embodiment of the current invention.

FIG. 12 is a graphic illustration of a pickup date scheduling screen according to a preferred embodiment of the current invention.

FIG. 13 is a graphic illustration of a pickup time window scheduling screen according to a preferred embodiment of the current invention.

FIG. 14 is a graphic illustration of a pickup transition screen according to a preferred embodiment of the current invention.

FIG. 15 is a graphic illustration of a delivery date scheduling screen according to a preferred embodiment of the current invention.

FIG. 16 is a graphic illustration of a delivery time window scheduling screen according to a preferred embodiment of the current invention.

FIG. 17 is a graphic illustration of a delivery transition screen according to a preferred embodiment of the current invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

As will be appreciated by one skilled in the art, the present invention may be embodied as a method, a data processing system, or a computer program product. Accordingly, the present invention may take the form of an entirely hardware embodiment, an entirely software embodiment or an embodiment combining software and hardware aspects. Furthermore, the present invention may take the form of a computer program product on a computer-readable storage medium having computer-readable program code means embodied in the storage medium. More particularly, the

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present invention may take the form of web-implemented computer software. Any suitable computer-readable storage medium may be utilized including hard disks, CD-ROMs, optical storage devices, or magnetic storage devices.

The present invention is described below with reference to block diagrams and flowchart illustrations of methods, apparatuses (i.e., systems) and computer program products according to an embodiment of the invention. It will be understood that each block of the block diagrams and flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, respectively, can be implemented by computer program instructions. These computer program instructions may be loaded onto a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions which execute on the computer or other programmable data processing apparatus create means for implementing the functions specified in the flowchart block or blocks.

These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means that implement the function specified in the flowchart block or blocks. The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions that execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the flowchart block or blocks.

Accordingly, blocks of the block diagrams and flowchart illustrations support combinations of means for performing the specified functions, combinations of steps for performing the specified functions and program instruction means for performing the specified functions. It will also be understood that each block of the block diagrams and flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, can be implemented by special purpose hardware-based computer systems

that perform the specified functions or steps, or combinations of special purpose hardware and computer instructions.

System Architecture

FIG. 1 shows a block diagram of a scheduling system 10 in accordance with a preferred embodiment of the present invention. As may be understood from this figure, the scheduling system 10 includes a customer client computer 20, one or more computer networks 32, 35, a web server 40, a scheduling server 50, and a router client computer 55. As can be appreciated by one of ordinary skill in the art, the one or more computer networks 32, 35 facilitate communication between the customer client computer 20, the web server 40, the scheduling server 50, and the router client computer 55. These one or more computer networks 32, 35 may include any of a variety of types of computer networks such as the Internet, a private intranet, a public switch telephone network (PSTN), or any other type of network 32 known in the art. In a preferred embodiment of the invention, the network that provides a communication link between the customer client computer 20 and the web server 40 is the Internet, and the network 35 that provides a communications link between the web server 40, the scheduling server 50, and the router client computer 55 is a Local Area Network (LAN).

FIG. 2 shows a block diagram of an exemplary embodiment of the scheduling server 50 of FIG. 1. The scheduling server 50 includes a processor 60 that communicates with other elements within the scheduling server 50 via a system interface or bus 61. Also included in the scheduling server 50 is a display device/input device 64 for receiving and displaying data. This display device/input device 64 may be, for example, a keyboard or pointing device that is used in combination with a monitor. The scheduling server 50 further includes memory 66, which preferably includes both read only memory (ROM) 65 and random access memory (RAM) 67. The server's ROM 65 is used to store a basic input/output system 26 (BIOS), containing the basic routines that help to transfer information between elements within the scheduling server 50.

In addition, the scheduling server 50 includes at least one storage device 63, such as a hard disk drive, a floppy disk drive, a CD Rom drive, or optical disk drive, for

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storing information on various computer-readable media, such as a hard disk, a removable magnetic disk, or a CD-ROM disk. As will be appreciated by one of ordinary skill in the art, each of these storage devices **63** is connected to the system bus **61** by an appropriate interface. The storage devices **63** and their associated computer-readable media provide nonvolatile storage for the scheduling server **50**. It is important to note that the computer-readable media described above could be replaced by any other type of computer-readable media known in the art. Such media include, for example, magnetic cassettes, flash memory cards, digital video disks, and Bernoulli cartridges.

A number of program modules may be stored by the various storage devices and within RAM **67**. Such program modules include an operating system **80**, a primary scheduling module **100**, and a secondary scheduling module **200**. The primary scheduling module **100** and secondary scheduling module **200** control certain aspects of the operation of the scheduling server **50**, as is described in more detail below, with the assistance of the processor **60** and an operating system **80**.

Also located within the scheduling server **50** is a network interface **74**, for interfacing and communicating with other elements of a computer network. It will be appreciated by one of ordinary skill in the art that one or more of the scheduling server **50** components may be located geographically remotely from other scheduling server **50** components. Furthermore, one or more of the components may be combined, and additional components performing functions described herein may be included in the scheduling server **50**.

Definitions

As used in this specification, the term "delivery vehicle visit" refers to a trip by a vehicle, such as a delivery vehicle, in which the vehicle either picks up items from a customer or delivers items to the customer. This term may also refer to a trip by a vehicle, such as a delivery vehicle, in which the vehicle both picks up items from, and delivers items to, a customer.

As used in this specification, the term "customer visit" refers to a visit to a customer to perform a service, such as picking up items from a customer, delivering items

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to a customer, or both picking items up from and delivering items to the customer. The service may also include, for example, services to be performed at the customer's residence. Such services may include, for example, maintenance work or work related to the installation of a product for the customer (such as the installation of cable TV service). Such services may also include work that needs to be performed according to a periodic schedule, such as lawn service work or pool cleaning.

The term "time window" refers to a discrete block of time during which a particular delivery vehicle visit may be scheduled. For example, a particular delivery vehicle visit may be scheduled to be made within a 9:00am–10:00am time window. In this example, the scheduled delivery vehicle visit should be made sometime between 9:00am and 10:00am.

The term "delivery service" refers to any entity that executes pickups or deliveries. One example of such an entity would be a dry cleaning business that picks up dirty laundry from, and delivers clean laundry to, a customer.

The term "user" refers to an individual who is using a computer system to schedule a delivery vehicle visit. This user may also be a customer of a particular delivery service. Accordingly, "user" and "customer" are often used interchangeably below.

The term "real-time" as applied to a scheduling system according to the present invention indicates that the system is configured to allow a user to issue a request that a particular event be scheduled, and that is also configured to process the request and display the results of the request to the user in a substantially immediate manner. Accordingly, when using a real-time scheduling system, a user would reasonably expect to enter a particular request, and to receive the results of the request without waiting for a significant period of time. Preferably, a real-time scheduling system would normally display the results of a user's request within 1 minute of receiving the request.

The term "real-time" as applied to executing a series of steps indicates that the steps are executed in a substantially immediate manner. Accordingly, when a system is executing a series of steps in real time, a user would reasonably expect the system to execute the steps while the user waits. Similarly, the user would reasonably expect the

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system to execute the steps in a reasonably short period of time. Preferably, a system executing a series of steps in real-time would normally execute the steps in 1 minute or less.

Introduction

As mentioned above, the current invention provides a scheduling system that allows a user to schedule, in real time, two or more delivery vehicle visits (or customer visits) in response to a single request. A preferred embodiment and various alternative embodiments of the invention are described in greater detail below.

Preferred Embodiment of the Invention

Figures 3A-3C, and 4A-4B provide an overview of the logical steps executed by a system and method according to a preferred embodiment of the invention. More particularly, Figures 3A – 3C describe a primary scheduling module **300** that may be used to request, and tentatively schedule, a series of reoccurring delivery vehicle visits. Similarly, Figures 4A and 4B describe a secondary scheduling module **400** that may be later used to firmly schedule each tentatively scheduled delivery vehicle visit. The operation of the primary and secondary scheduling modules **300**, **400** is discussed in detail below.

As noted above with regard to Figure 1, in a preferred embodiment of the invention, the primary and secondary scheduling modules **300**, **400** are executed by a scheduling server **50** that is connected to a web server **40** and a router client computer **55** via a network **35** such as a LAN. Furthermore, the web server **40** communicates with at least one customer client computer **20** via a network such as the Internet.

In a preferred embodiment of the invention, the primary and secondary scheduling modules **300**, **400** are used to allow customers to schedule, in real time, reoccurring series of delivery vehicle visits to be made by a delivery service. For example, to schedule a pickup or series of reoccurring pickups, a customer typically enters his name, address, phone number, user id, or other identifying information on the preliminary screens of the delivery service's web site. The user then enters a date on which they would like a

pickup to be made and, preferably, specifies the items to be picked up. The user then specifies, preferably using an input button on the delivery service's web site, that they would like to schedule the pickup. In response to this request, the system begins executing the primary scheduling module 300, which is configured for executing the steps shown in Figures 3A-3C.

Similarly, to schedule a delivery or reoccurring series of deliveries, a customer typically enters his name, address, phone number, user id, or other identifying information on the preliminary screens of the delivery service's web site. The user then selects items to be delivered by, for example, selecting the items from various display screens. The user then enters a request that the delivery be made on a certain date. In response to this request, the system begins executing the primary scheduling module 300, which, as noted above, is configured for executing the steps shown in Figure 3A.

As shown in Figure 3A, when executing the primary scheduling module 300, at Step 305, the system first receives a request from a user to schedule a delivery vehicle visit. The system then advances to Step 310 where it prompts the user to specify a requested day for the delivery vehicle visit. The system then determines, at Step 315, whether any time windows are available for the requested day. Stated differently, at Step 315, the system determines whether the delivery service would be willing to make a delivery vehicle visit to the customer within any time window on the requested day. In a preferred embodiment of the invention, the system makes this determination by trying to identify one or more time windows in which it would be possible, and in which it would make business sense, to make the requested delivery vehicle visit to the customer on the requested day. Thus, in a preferred embodiment of the invention, if the system identifies one or more time windows in which it would be possible, and in which it would make business sense, to make the requested delivery vehicle visit on the requested day, the answer to the question posed at Step 315 is "yes". If not, the answer is "no."

The system preferably performs Step 315 in the manner set forth in pending U.S. Patent Application 09/811,375, filed March 16, 2001, and titled "Real Time Delivery Feasibility Analysis Systems and Methods", which is hereby incorporated herein by reference. In an alternative embodiment of the invention, the system performs this step

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using the "bucket method", which is well known in the art, and which also is described in pending U.S. Patent Application 09/811,375.

If the system determines, at Step **315**, that no time windows are available for the requested day, the system proceeds to Step **320** where it determines whether the user wants to try to schedule the requested delivery vehicle visit for a day other than the requested day. If so, the system returns to Step **310** where it again prompts the user to specify a requested day for the delivery vehicle visit. If not, the system proceeds to Step **330**, where it ends execution of the primary scheduling module **300**.

If the system determines, at Step **315**, that one or more time windows are available for the requested day, the system proceeds to Step **340** where it displays the time windows identified in Step **315** on the user's display screen. Thus, at Step **340**, the system displays at least one time window in which the delivery service would be willing to make a delivery vehicle visit to the customer on the requested day. In a preferred embodiment of the invention, the system displays the identified time windows in a scheduling window **600** such as the scheduling window shown in Figure 6A. As may be understood from this figure, such a window includes the requested date for the delivery vehicle visit **602** and one or more select buttons **605-630** that correspond to the windows in which the delivery service would be willing to make the delivery vehicle visit.

After executing Step **340**, the system proceeds to Step **345** where it allows a user to request that a first delivery vehicle visit be made to the customer within a selected one of the displayed time windows. In the preferred embodiment of the invention, the system executes step **345** by displaying a scheduling window **600** such as the scheduling window **600** shown in Figure 6A. A user may use this scheduling window **600** to select a particular one of the displayed time windows by using a mouse to select a button **605-630** that corresponds to the particular time window. For example, to select the 9:00am - 10:00am time window, the user would use a mouse to select the "9:00am - 10:00am" button **605** displayed in the scheduling window **600**.

After the user selects one of the displayed time windows **605-630**, the system proceeds to Step **350**. In this step, the system determines whether the user wishes to schedule a periodic series of delivery vehicle visits that includes the first delivery vehicle

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visit and one or more additional delivery vehicle visits. Preferably, each delivery vehicle visit within the series is to be made on a different day, but within the selected time window.

Figure 6B depicts a preferred embodiment of the invention executing Step **350**. As may be understood from this figure, a user has requested that a first delivery vehicle visit be made to a customer within a 9:00am-10:00am time window on Wednesday, November 21, 2001. In response to this selection, the system has displayed a reoccurring delivery vehicle visit question window **623** that includes text asking whether the user wishes to schedule the delivery vehicle visit (in this case, a delivery) to reoccur on a periodic basis. The reoccurring delivery vehicle visit question window **623** includes a "Yes" button **625**, a "No" button **630**, and a "Cancel" button **635** for allowing a user to indicate their answer. The user may select the "Yes" button **625** if they wish to schedule the delivery vehicle visit to reoccur on a periodic basis. Similarly, the user may select the "No" button **630** if they do not wish to schedule the delivery vehicle visit to reoccur on a periodic basis. The user may select the "Cancel" button **635** if they wish to return to the scheduling window to select another time window for the delivery vehicle visit.

If the user specifies, at Step **350** that the delivery vehicle visit should not be scheduled to reoccur, the system proceeds to Step **385**, where it firmly schedules the first requested delivery vehicle visit. The system then advances to Step **390** where it completes execution of the primary scheduling module **300**.

If the user specifies, in Step **350** that the delivery vehicle visit should be scheduled to reoccur, the system proceeds to Step **360**, where it allows the user to specify a schedule for the requested series of delivery vehicle visits. For example, in a preferred embodiment of the invention shown in Figure 6C, the system displays a reoccurring delivery vehicle visit scheduling window **624** that allows a user to indicate how often they wish for the delivery vehicle visit to reoccur. This reoccurring delivery vehicle visit scheduling window **624** includes a button **640** that allows the user to specify that the delivery vehicle visit should occur on the same day every week (e.g., every Wednesday) within the currently selected time window (9:00am–10:00am). Similarly, the reoccurring delivery vehicle visit scheduling window **624** includes other buttons **645, 650, 655** that

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allow the user to specify, respectively, that the delivery vehicle visit should occur within the selected time window every other week (e.g., every other Wednesday), once every month on the same day during the same week of every month (e.g., on the third Wednesday of every month), or once every month on the same calendar day every month (e.g. on the 21st day of every month). It should be understood that the system may alternatively be configured to allow the user to schedule the deliveries to re-occur according to any schedule, and preferably, according to any periodic schedule.

In a preferred embodiment of the system, the user is allowed to optionally schedule a finite number of periodically occurring delivery vehicle visits. For example, the user may be allowed to specify that the system should make a particular delivery vehicle visit according to a specified schedule for a certain number of weeks, or until a certain number of delivery vehicle visits have been completed.

After the user specifies a schedule for the requested delivery vehicle visits at Step **360**, the system advances to Step **365**, where it determines, based on a first set of scheduling information, whether to tentatively schedule each of the additional requested delivery vehicle visits according to the specified schedule. In a preferred embodiment of the invention, this first set of scheduling information includes information regarding previously scheduled series of reoccurring deliveries. In an alternative embodiment of the invention, this first set of scheduling information also includes information regarding previously scheduled one-time deliveries, and information regarding the days on which the delivery service will not perform delivery vehicle visits.

More particularly, in a preferred embodiment of the invention, the system determines at Step **365** whether it would be possible, and whether it would make business sense, to make each of the additional delivery vehicle visits according to the specified schedule. For example, a user may request, at Steps **345** and **360**, that a first delivery be made between 9:00am and 10:00am on Thursday, August 9, 2001, and that the delivery be made on a weekly basis until three deliveries have been completed. In this example, at Step **365**, the system would first determine whether it would be possible, and whether it would make business sense, to repeat the first delivery on Thursday, August 16, 2001 between 9:00am and 10:00am. The system would also determine, at Step **365**, whether it

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would be possible, and whether it would make business sense, to repeat the first delivery again on Thursday, August 23, 2001 between 9:00am and 10:00am. As noted above, the system would have already confirmed at Step **315**, that the first delivery could be made as requested on Thursday, August 9, 2001.

In a preferred embodiment of the invention, the system uses the techniques set forth in pending U.S. patent application 09/811,375 (referenced above) to determine whether it would be possible, and whether it would make business sense, to make a requested delivery vehicle visit within a particular time window on a particular day. As described in detail in pending patent application 09/811,375, in making this determination, the system considers: (1) whether the particular time window has been closed (which may occur, for example, if the time window falls on a holiday or on another day on which the delivery service will not make delivery vehicle visits); (2) whether the system has the capacity to make the delivery vehicle visit, and all other previously scheduled delivery vehicle visits, within the particular time window; and (3) whether the cost of making the requested delivery vehicle visit and all previously scheduled delivery vehicle visits would exceed a predefined threshold cost.

As an aside, Applicants note that pending patent application 09/811,375 does not describe determining whether it would be possible, and whether it would make business sense, to make a requested delivery vehicle visit within a particular time window on a particular day based on previously scheduled pickups. However, the techniques described in regard to making this determination based on previously scheduled deliveries may also be applied to making this determination based on previously scheduled pickups.

As described in the pending 09/811,375 patent application referenced above, the system preferably uses a standard routing and scheduling program, such as Roadnet 5000 to determine the cost of making requested delivery vehicle visits. This routing and scheduling program is preferably executed on a separate router client computer **55**.

In a preferred embodiment of the invention, the system maintains a tentative scheduling database that includes scheduling information for series of orders that have been tentatively scheduled to occur according to various reoccurring schedules. This tentative scheduling database preferably also includes the dates and times (such as

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holidays) during which the delivery service will not make delivery vehicle visits. The system accesses the information within the tentative scheduling database in a manner known in the art and considers this information in Step **365** when determining whether it would be possible, and whether it would make business sense, to make a particular requested delivery vehicle visit. Preferably, the tentative scheduling database also includes information regarding tentatively and firmly scheduled one-time orders.

In a preferred embodiment of the invention, if the system determines, at Step **365**, that the system should not tentatively schedule each of the additional requested delivery vehicle visits, the system informs the user at Step **375** that the delivery service is unable to schedule the entire requested series of delivery vehicle visits. The system then proceeds to Step **380** where it prompts the user to specify whether they would like to schedule the first delivery vehicle visit as a one-time (non-reoccurring) delivery vehicle visit. If so, the system schedules the first requested delivery vehicle visit at Step **385** and preferably displays a confirmation to the user (such as the confirmation shown on the confirmation screen **700** shown in Figure 7A) that indicates the date and time that the delivery vehicle visit will be made. In a preferred embodiment of the invention, the system firmly schedules the first requested delivery vehicle visit at Step **385**. The system then completes execution of the primary scheduling module at Step **390**.

If the user specifies, at Step **380**, that they would not like to schedule the first delivery vehicle visit as a one-time (non-reoccurring) delivery vehicle visit, the system proceeds directly to Step **390** where it completes execution of the primary scheduling module **300** without scheduling any delivery vehicle visits.

Returning to Step **365**, if the system determines, based on the first set of scheduling information, that the system should tentatively schedule each of the additional requested delivery vehicle visits, the system informs the user that that the delivery service is able to tentatively schedule the requested series of deliveries. The system may do this, for example, by displaying a confirmation screen **700**, such as the confirmation screen **700** shown in Figure 7B. This confirmation screen **700** preferably indicates the schedule according to which the deliveries will be made.

Next, the system tentatively schedules each of the additional requested delivery vehicle visits at Step **370** by adding the additional requested delivery vehicle visits to the tentative scheduling database. The system then proceeds to Step **390** where it completes execution of the primary scheduling module **300**.

In an alternative embodiment of the invention, if the system determines at Step **365** to tentatively schedule most, but not all, of the requested delivery vehicle visits within a requested series, the system identifies alternative delivery dates and/or time windows for any requested delivery vehicle visits that the system has determined not to tentatively schedule, and presents the user with a list of these alternative delivery dates and/or time windows for these unscheduled delivery vehicle visits. The system then prompts the user to choose an alternative delivery date and/or time for each of the unscheduled delivery vehicle visits. The system then proceeds to Steps **370** and **390**, where it tentatively schedules each of the additional requested delivery vehicle visits and completes execution of the primary scheduling module **300**.

In a preferred embodiment of the invention, the system regularly executes a scheduling job that, in turn, executes a secondary scheduling module **400**. As is discussed in greater detail below, this secondary scheduling module **400** is used to determine whether the system should firmly schedule upcoming tentatively-scheduled delivery vehicle visits. If so, the secondary scheduling module firmly schedules the delivery vehicle visits by adding the delivery vehicle visits to a routing schedule for an upcoming period of time.

More specifically, in a preferred embodiment of the invention, the system executes the scheduling job (and, thus, the secondary scheduling module **400**) on a daily basis to determine whether to firmly schedule any delivery vehicle visits that are tentatively scheduled to occur during a particular upcoming time period. For example, in a preferred embodiment of the invention, the system executes the scheduling job on a daily basis to determine whether to firmly schedule any delivery vehicle visits that are tentatively scheduled to occur on a day that is one week from the day on which the system executes the scheduling job. For example, if the scheduling job is executed on a

particular Monday, the scheduling job determines whether to firmly schedule any delivery vehicle visits that are tentatively scheduled to occur on the following Monday.

The secondary scheduling module **400** begins at Step **405** where it advances to process the first tentatively scheduled delivery vehicle visit by preferably reading the first record within the tentative scheduling database. (In a preferred embodiment of the invention, each record in the tentative scheduling database corresponds to a delivery vehicle visit.) The system then advances to Step **410** where it determines whether the delivery vehicle visit is scheduled to occur in the upcoming time period (e.g., on the same weekday on which the scheduling job is executed, but in the following week). If not, the system advances to Step **440**, which is discussed in greater detail below. If so, the system advances to Step **415** where the system determines whether to firmly schedule the delivery vehicle visit based on a second set of scheduling information. In a preferred embodiment of the invention, this second set of scheduling information includes information regarding previously scheduled one-time and reoccurring delivery vehicle visits, as well as dates (such as holidays and weekends) on which the delivery service will not make delivery vehicle visits.

More specifically, in a preferred embodiment of the invention, the system determines at Step **415** whether it would be possible, and whether it would make business sense, to firmly schedule the delivery vehicle visit. In a preferred embodiment of the invention, the system makes this determination in the manner set forth in pending U.S. Patent Application 09/811,375, filed March 16, 2001, and titled "Real Time Delivery Feasibility Analysis Systems and Methods", which (as noted above) is hereby incorporated herein by reference. In an alternative embodiment of the invention, the system performs this process using the "bucket method", which is well known in the art, and which is also described in pending U.S. Patent Application 09/811,375.

In a preferred embodiment of the invention, the system may take economic considerations into account when determining, at Step **415**, whether to firmly schedule the particular delivery vehicle visit. For example, as described in greater detail in pending U.S. Patent Application 09/811,375, the system may first calculate the cost associated with making the delivery vehicle visit and compare this cost with a

predetermined threshold cost. If the cost associated with making the delivery vehicle visit is greater than the threshold cost, the system will determine not to firmly schedule the delivery vehicle visit. Otherwise, the system will not preclude the delivery vehicle visit from being firmly scheduled based upon cost.

If, at Step **415**, the system determines not to firmly schedule the delivery vehicle visit, the system proceeds to Step **430**, where it advises the user that the delivery vehicle visit can not be made as scheduled. Preferably, the system further advises the user that the delivery vehicle visit must be rescheduled.

The system may advise the user that the delivery vehicle visit can not be made as scheduled by, for example, informing a customer service representative to contact the user. Alternatively, the system may contact the user directly. For example, the system may transmit to the user an electronic mail message, a page, a voice mail message, an instant message, or any other electronically-based communication indicating that the delivery vehicle visit can not be made as scheduled. Alternatively, the system can generate and send the user a paper letter or other non-electronic communication to this effect via standard mail.

Next, the system proceeds to Step **435** where it allows the user to reschedule the delivery vehicle visit. For example, in a preferred embodiment of the invention, at Step **430**, the system sends the user an e-mail message informing the user that the delivery vehicle visit must be rescheduled. This e-mail preferably includes a link to a web page on which the user may reschedule the delivery vehicle visit by selecting from one or more available alternative dates and/or times for the delivery vehicle visit. Alternatively, in Step **430**, the system may transmit a phone number to the user that the user may call to reschedule the delivery vehicle visit either electronically or with the assistance of an customer service representative. Similarly, in Step **430**, the system may transmit an e-mail message and a list of available rescheduling options to the user and the user may reschedule the delivery vehicle visit by sending a selected rescheduling option to the provided e-mail address.

After completing Step **435**, the system proceeds to Step **440**, where the system determines whether all tentatively scheduled vehicle delivery vehicle visits have been

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processed. If so, the system completes execution of the secondary scheduling module at Step **445**. If not, the system proceeds to Step **442** where it advances to process the next tentatively scheduled delivery vehicle visit for the upcoming time period. The system then begins processing the next tentatively scheduled delivery vehicle visit at Step **410**.

While the core aspects of this embodiment of the invention are described in detail above, several additional aspects of the inventive system are worth noting. For example, the system may be configured to allow a user to use a single request to automatically schedule a series of reoccurring deliveries in which the contents of two or more of the deliveries are at least substantially the same. This aspect of the invention is especially useful when scheduling reoccurring deliveries of staple items, such as certain types of groceries that a consumer may need to purchase on a regular basis.

First Alternative Embodiment of the Scheduling Module

A first alternative embodiment of the scheduling module **500** is shown in Figures 5A-5C. When executing this the scheduling module, the system first receives, at Step **505**, a request from a user to schedule a first delivery vehicle visit. The system then advances to Step **510** where it prompts the user to specify a requested day for the first delivery vehicle visit. The system then determines, at Step **515**, whether any time windows are available for the requested day. Stated differently, at Step **515**, the system determines whether the delivery service would be willing to make a delivery vehicle visit to the customer within any time window on the requested day. In a preferred embodiment of the invention, the system makes this determination by trying to identify one or more time windows in which it would be possible, and in which it would make business sense, to make the requested delivery vehicle visit to the customer on the requested day. Thus, in a preferred embodiment of the invention, if the system identifies one or more time windows in which it would be possible, and in which it would make business sense, to make the requested delivery vehicle visit on the requested day, the answer to the question posed at Step **515** is "yes". If not, the answer is "no."

The system preferably performs Step **515** in the manner set forth in pending U.S. Patent Application 09/811,375, filed March 16, 2001, and titled "Real Time Delivery

Feasibility Analysis Systems and Methods", which, as noted above, are incorporated herein by reference. In an alternative embodiment of the invention, the system performs this step using the "bucket method", which is well known in the art, and which also is described in pending U.S. Patent Application 09/811,375.

If the system determines, at Step **515**, that no time windows are available for the requested day, the system proceeds to Step **520** where it determines whether the user wants to try to schedule the requested delivery vehicle visit for a day other than the requested day. If so, the system returns to Step **510** where it again prompts the user to specify a requested day (which may be referred to as the "first requested day") for the delivery vehicle visit. If not, the system proceeds to Step **530**, where it ends execution of the primary scheduling module **500**.

If the system determines, at Step **515**, that one or more time windows are available for the requested day, the system proceeds to Step **540** where it displays the time windows identified in Step **515** on the user's display screen. Thus, at Step **540**, the system displays at least one time window in which the delivery service would be willing to make a delivery vehicle visit to the customer on the requested day. In a preferred embodiment of the invention, the system displays the identified time windows in a scheduling window **600** such as the scheduling window shown in Figure 6A. As may be understood from this figure, such a scheduling window **600** includes the requested date for the delivery vehicle visit **602** and one or more selection buttons **605-630** that correspond to the time windows in which the delivery service would be willing to make the delivery vehicle visit.

After executing Step **540**, the system proceeds to Step **545** where it allows a user to request that the first delivery vehicle visit be made to the customer within a selected one of the displayed time windows. In the preferred embodiment of the invention, the system executes step **545** by displaying the scheduling window **600** described above. A user may use this window **600** to select a particular displayed time window by using a mouse to select a scheduling button **605-630** that corresponds to the particular time window.

After the user selects one of the displayed time windows **605-630**, the system proceeds to Step **550**. In this step, the system determines whether the user wishes to schedule a second delivery vehicle visit to be made on a second day, but within the time window selected for the first delivery vehicle visit.

Figure 6D depicts a preferred embodiment of the invention executing Step **550**. As may be understood from this figure, a user has requested that a first delivery vehicle visit be made to a customer within a 9:00am-10:00am time window on Wednesday, November 21, 2001. In response to this selection, the system has displayed a reoccurring delivery vehicle visit question window **665** that includes text asking whether the user wishes to schedule a second delivery vehicle visit to be made on a second day, but within the selected time window. More specifically, in this example, the delivery vehicle visit question window **665** displays text asking the user whether the user wants to schedule the delivery vehicle visit to be made more than once in the upcoming week, but within the same time window.

As shown in Figure 6D, the reoccurring delivery vehicle visit question window **665** preferably includes a "Yes" button **670**, a "No" button **672**, and a "Cancel" button **674** for allowing a user to indicate their answer. The user may select the "Yes" button **670** if they want to schedule the delivery vehicle visit to be made more than once in the upcoming week. Similarly, the other user may select the "No" button **672** if they do not wish to schedule the delivery vehicle visit to be made more than once in the upcoming week. The user may select the "Cancel" button **674** if they wish to return to the scheduling window **600** to select another time window for the delivery vehicle visit.

If the user specifies, at Step **550** that they do not wish to schedule the delivery vehicle visit to be made more than once in the upcoming week, the system proceeds to Step **585**, where it firmly schedules the first requested delivery vehicle visit. The system then advances to Step **590** where it completes execution of the scheduling module **500**.

If the user specifies, at Step **550** that the delivery vehicle visit should be scheduled to reoccur, the system proceeds to Step **560**, where it allows the user to specify a particular day (which may be referred to as "the second requested day") on which the second delivery vehicle visit should occur. In a preferred embodiment of the invention,

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the system does this by displaying a dialog box, such as the dialog box **675** shown in Figure 6E, and uses this dialog box to determine the days on which the user would like the first and second delivery vehicle visits to occur.

This dialog box **675** preferably includes one or more scheduling buttons **680 – 686** that are configured to allow the user to indicate on which two days within the upcoming week the delivery vehicle visit should be made. For example, in the example shown in Figure 6E, scheduling button **680** provides the user with the option of requesting that a delivery be made within the 9:00am-10:00am time window on both Wednesday, November 21 and Thursday, November 22. Similarly, scheduling button **682** provides the user with the option of scheduling the delivery to be made within the 9:00am-10:00am time window on both Wednesday, November 21, and Friday, November 23. In this example, scheduling Buttons **684** and **686** also provide the user with other unique options of scheduling the delivery to be made within the 9:00am-10:00am time window within two different days within the upcoming week.

It should be understood that, in this embodiment of the invention, the user issues a single request by selecting one of the scheduling buttons **680 – 686** displayed within dialog box **675**. More particularly, by selecting one of the scheduling buttons **680--686**, the user defines a series of delivery vehicle visits comprising two delivery vehicle visits (in this case, deliveries) and issues a request that the system schedule the two delivery vehicle visits. For example, by selecting the modified version of scheduling button **680** described above, the user issues a request that a particular delivery be made within the 9:00am-10:00am time window on both Wednesday, November 21 and Thursday, November 22, 2001.

After the user specifies a schedule for the requested delivery vehicle visits at Step **560**, the system advances to Step **565**, where the system determines whether the second delivery vehicle visit should be scheduled within the requested particular time window on the second requested day. In a preferred embodiment of the invention, the system bases this determination on whether it would be possible, and whether it would make business sense, to schedule the delivery vehicle visit within the requested particular time window on the second requested day. In a preferred embodiment of the invention, the system

makes this determination in the manner set forth in pending U.S. Patent Application 09/811,375, which, as noted above, is incorporated herein by reference.

If the system determines, at Step **565,** that the second delivery vehicle visit should be scheduled within the requested particular time window on the second requested day, the system proceeds to Step **570** where it schedules the first and second delivery vehicle visits as requested. In a preferred embodiment of the invention, the system firmly schedules both the first and second delivery vehicle visits at Step **570**. The system then proceeds to Step **590** where it completes execution of the scheduling module **500**.

In a preferred embodiment of the invention, if the system determines, at Step **565,** that the system should not schedule the second delivery vehicle visit on the particular day specified by the user, and within the particular time window, the system informs the user at Step **575** that the delivery service is unable to schedule the second delivery vehicle visit as requested. The system then proceeds to Step **580** where it prompts the user to specify whether they would like to schedule the first delivery vehicle visit as a one-time (non-reoccurring) delivery vehicle visit. If so, the system schedules the first requested delivery vehicle visit at Step **585** and preferably displays a confirmation to the user that indicates the date and time that the scheduled delivery vehicle visit will be made. In a preferred embodiment of the invention, the system firmly schedules the first requested delivery vehicle visit at Step **585**. The system then completes execution of the primary scheduling module at Step **590**.

If the user specifies, at Step **580**, that they would not like to schedule the first delivery vehicle visit as a one-time (non-reoccurring) delivery vehicle visit, the system proceeds directly to Step **590** where it completes execution of the primary scheduling module **500** without scheduling any delivery vehicle visits.

While the core aspects of the this embodiment are described in detail above, several additional aspects of the system are worth noting. For example, the system is preferably configured to operate in real time. This is advantageous because it provides the user with instant feedback regarding the user's scheduling requests. Similarly, the system is preferably configured to display a confirmation message immediately after scheduling one or more requested delivery vehicle visits. More particularly, in one

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embodiment of the invention, the system is configured for displaying a confirmation message to a user confirming that the first and second delivery vehicle visits have been scheduled. The system displays this confirmation message in response to a combination of: (1) the user's single request; (2) a determination at Step **515** that the first delivery vehicle visit should be scheduled within the requested particular time window on the first day; and (3) a determination at Step **565** that the second delivery vehicle visit should be scheduled within the requested particular time window on the second day. Examples of such confirmation messages are discussed above in reference to Figures 7A and 7B.

Furthermore, in a preferred embodiment of the invention, the first and second delivery vehicle visits are deliveries, and the second delivery includes substantially all of the items included in the first delivery. In this embodiment of the invention, the user's single request comprises: (1) a definition of a first set of items to be included within the first delivery; (2) an indication that the first set of items should be delivered within a particular time window on a first day; and (3) an indication that the first set of items should be delivered, according to a reoccurring delivery schedule, within the same particular time window on at least one day other than the first day. It should be understood that, in one embodiment of the invention, the first and second delivery vehicle visits may both be pickups rather than deliveries. It should also be understood that this embodiment of the invention could be modified to use the techniques described above to allow a user to use a single request to schedule more than two deliveries.

In one preferred embodiment of the invention, the system is configured to only display, in window **675** (see Figure 6E), pairs of days in which the delivery service can make the delivery vehicle visit within the time window on both days. Thus, before displaying a particular combination of days as an option to the user, the system determines, in the manner set forth above, that the delivery service is willing to make the delivery vehicle visit within the requested time window on both the first day and the second day. This results is a more efficient delivery scheduling process.

First Alternative Embodiment of Scheduling Screen

An alternative embodiment of a scheduling screen **800** according to the present invention is shown in Figures 8A and 8B. As may be understood from these figures, this alternative scheduling screen **800** allows users to quickly specify that a requested delivery vehicle visit should reoccur within a selected time window according to a particular schedule. To do this, the user first selects a particular time window **805-830** as discussed above. The user then selects a reoccurrence button **832** on the scheduling screen **800**. As shown in Figure 8B, this causes the system to display a drop-down box **831** of scheduling options **836-839**. Next, the user then selects the desired scheduling option **836-839** from the drop-down box **831**. Finally, the user issues a request that the specified series of delivery vehicle visits be made by selecting the continue button **835** on the scheduling screen **800**. The system then schedules the requested series of delivery vehicle visits preferably using either the primary and secondary scheduling modules **300-400**, or an alternative embodiment of the scheduling module **500**, such as the first alternative embodiment of the scheduling module described above.

Second Alternative Embodiment of the Invention

A second alternative embodiment of the scheduling module **900** is shown in Figures 9A – 9C. As shown in these figures, when the scheduling module **900** is executed by the system, the system first receives, at Step **905**, a request from a user to schedule both a pickup, and a delivery that is related to the pickup. For example, the system may receive a request from a user to schedule a time for a dry cleaning service to pick up laundry from the user's house, and to schedule a time for the dry cleaning service to deliver the user's laundry back to the user's house after the laundry has been dry cleaned. Here, the pickup and delivery are related because they involve transporting clothing as part of a single dry cleaning transaction.

In a preferred embodiment of the invention, the system allows a user to enter the request referenced in Step **905** using one or more display screens, such as the display screen **1000** shown in Figure 10. This display screen is discussed in greater detail below.

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After receiving a request from a user to schedule a related pickup and delivery at Step **905**, the system proceeds to Step **910** where it prompts the user to specify a day on which the pickup should be made. This day may be referred to as a "pickup day". The system then advances to Step **915**, where it determines whether any time windows are available for the requested pickup day. Stated differently, at Step **915**, the system determines whether the delivery service would be willing to make the pickup within any time window on the requested day. In a preferred embodiment of the invention, the system makes this determination by trying to identify one or more time windows in which it would be possible, and in which it would make business sense, to make the requested pickup on the requested day. If the system identifies one or more time windows in which it would be possible, and in which it would make business sense, to make the requested pickup on the requested day, the answer to the question posed at Step **915** is "yes". If not, the answer is "no."

The system preferably performs Step **915** in the manner set forth in pending U.S. Patent Application 09/811,375, filed March 16, 2001, and titled "Real Time Delivery Feasibility Analysis Systems and Methods", which is hereby incorporated herein by reference. In an alternative embodiment of the invention, the system performs this process using the "bucket method", which is well known in the art, and which is also described in pending U.S. Patent Application 09/811,375.

If the system determines, at Step **915**, that no time windows are available for the requested pickup day, the system proceeds to Step **920** where it determines whether the user wants to try to schedule the pickup for a day other than the requested day. If so, the system proceeds back to Step **910** where it again prompts the user to specify a requested day for the pickup. If the system determines, at Step **920**, that the user does not want to schedule the pickup for another day, the system proceeds to Step **930**, where it ends execution of the scheduling module **900**.

Returning to Step **915**, if the system determines, that one or more time windows are available for the requested day, the system proceeds to Step **925** where it displays the time windows identified in Step **915** on the user's display screen. Thus, at Step **925**, the system displays at least one time window in which the delivery service would be willing

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to make the pickup on the requested pickup day. In a preferred embodiment of the invention, the system displays the identified time windows on a pickup time window scheduling screen such as the scheduling screen **1300** shown in Figure 13. As may be understood from this figure, the pickup time window scheduling screen **1300** preferably includes the requested date for the pickup and one or more time windows **1305** in which the delivery service would be willing to make the pickup.

After executing Step **925**, the system proceeds to Step **935** where it determines whether one of the displayed time windows is acceptable to the user. The system preferably makes this determination by accepting an appropriate input from a user. In a preferred embodiment of the invention, the system allows a user to indicate that one of the displayed time windows is acceptable by selecting a button representing an acceptable time window (such as buttons **1305**) and then selecting a continue button **1310**. In this embodiment of the invention, the user may indicate that none of the windows are acceptable by selecting a cancel button **1315**, and then clicking on a "cancel order" button **1405** on a transition screen **1400** that is displayed in response to the user clicking the cancel button **1315**.

If the system determines, at Step **935**, that none of the displayed time windows is acceptable to the user, the system returns to Step **920**, and proceeds as described above. If the system determines, at Step **935**, that one of the time windows is acceptable to the user, the system proceeds to Step **940**, where it allows the user to request that the pickup be made within a selected one of the displayed time windows. In a preferred embodiment of the invention, the system allows the user to make this request by selecting a button (such as one of the buttons **1305** shown in Figure 13) corresponding to one of the displayed time windows.

Next, the system proceeds to Step **945** where it prompts the user to specify a delivery day on which the requested delivery should be made. After the user inputs a requested delivery day, the system advances to Step **950**, where it determines whether there is sufficient processing time between the time window selected for the pickup and any time window within the requested delivery day.

In one example, a user may request, in Steps **910** and **940**, that a dry cleaning service pick up their dirty laundry within a 9:00am–10:00am time window on September 28, 2001. The user may further specify, at Step **945**, that the laundry should be returned to the user on September 30, 2001. In this example, at Step **950**, the system would determine whether sufficient processing time exists between the 9:00am – 10:00am time window on September 28, 2001 and any time window on September 30, 2001 to pick up, clean, and return the user's laundry. In one embodiment of the invention, the system does this by: (1) determining the number of minutes between the ending time of the time window specified for the pickup (in this example 10:00am), and the beginning time of the last time window on the day requested for the delivery (this number of minutes may be referred to as the "lag time" between time window specified for the pickup and the day requested for the delivery); and (2) comparing this lag time with a threshold lag time associated with the requested pickup/delivery. In a preferred embodiment of the invention, the system may be programmed to associate different threshold lag times with different activities requested by the user. For example, in a dry cleaning context, the system may be programmed to use a first threshold lag time if the user has only requested that shirts be cleaned, and a second, longer, threshold lag time if the user has requested that one or more suits be dry cleaned. As will be understood by one skilled in the art, users can define threshold lag times that correspond to various tasks or requests, based upon any factors chosen by the user.

If the system determines, at Step **950**, that there is not sufficient processing time between the time window selected for the pickup and any time window on the requested delivery day, the system advances to Step **955** where it informs the user that the delivery may not be scheduled for the requested delivery day. The system then proceeds to Step **965**, where the system determines whether the user wants to try to schedule the requested delivery for another day. If not, the system completes execution of the scheduling module at Step **975**. If so, the system returns to Step **945**, where it prompts the user to specify another day on which the delivery should be made.

Returning to Step **950**, if the system determines that there is sufficient processing time between the time window selected for the pickup and any time window within the

requested delivery day, the system proceeds to Step **960**, where it determines whether any time windows are available for the requested delivery on the requested delivery day. In a preferred embodiment of the invention, the system makes this determination is the same general manner as that described above in reference to Step **915**. However, in determining whether it would be possible to make the delivery within a particular time window on the requested day, the system takes into account whether sufficient time exists between the particular time window and the time window requested for the pickup. In one embodiment of the invention, the system does this by: (1) determining the number of minutes between the ending time of the time window specified for the pickup (in this example 10:00am), and the beginning time of the particular time window (this number of minutes may be referred to as the "lag time" between the time window specified for the pickup and the particular time window); and (2) comparing this lag time with a threshold lag time associated with the requested pickup/delivery. As noted above, in a preferred embodiment of the invention, the system may be programmed to associate different threshold lag times with different activities requested by the user.

If the system determines, at Step **960**, that no time windows are available for the requested delivery day, the system proceeds to Step **965**, where it determines whether the user wants to try to schedule the requested delivery for another day. If not, the system completes execution of the scheduling module at Step **975**. If so, the system returns to Step **945**, where it prompts the user to specify another day on which the delivery should be made.

If the system determines, at Step **960**, that one or more time windows are available for the requested day, the system proceeds to Step **970** where it displays the time windows identified in Step **960** on the user's display screen. Thus, at Step **970**, the system displays at least one time window in which the delivery service would be willing to make the delivery on the requested day. In a preferred embodiment of the invention, the system displays the identified time windows in a scheduling window such as the scheduling window **1600** shown in Figure 16. As may be understood from this figure, such a scheduling window **1600** includes the requested date for the delivery **1603** and one

or more buttons **1605-1615** that correspond to time windows in which the delivery service would be willing to make the delivery.

After executing Step **970**, the system proceeds to Step **980** where it determines whether one of the displayed time windows is acceptable to the user. The system preferably makes this determination by accepting an appropriate input from a user. In a preferred embodiment of the invention, the system allows a user to indicate that one of the displayed time windows is acceptable by selecting a button representing an acceptable time window (such as buttons **1605 – 1615**, shown in Figure 16) and then selecting a continue button **1620**. In this embodiment of the invention, the user may indicate that none of the windows are acceptable by selecting a cancel button **1625**, and then clicking on a "cancel order" button **1705** on a transition screen **1700** that is displayed in response to the user clicking the "cancel order" button **1705**.

If the system determines, at Step **980**, that none of the displayed time windows is acceptable to the user, the system advances to Step **965**, and proceeds as described above. If the system determines, at Step **980**, that one of the time windows is acceptable to the user, the system proceeds to Step **985**, where it allows the user to request that the delivery be made within a selected one of the displayed time windows.

Next, the system advances to Step **990**, where it schedules the pickup and the delivery as indicated by the user in steps **940** and **985**. The system then ends execution of the scheduling module **900** at Step **995**.

An example of a scheduling system that functions according to a preferred embodiment of the scheduling module **900** described above is depicted in Figures 10 – 17. This system is used for scheduling pickups and deliveries the context of a dry cleaning business.

To use the system, a user may log on to a dry cleaning service's home page, such as the home page **1000** shown in Figure 10. This home page **1000** preferably allows the user to select various service-related and informational options using one or more selection buttons **1005-1015**. For example, in a preferred embodiment of the invention, the user may choose to schedule a pickup and a related delivery by selecting a "Schedule a Pickup and Delivery" button **1015**. This takes the user to an order entry screen, such as

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screen **1100** shown in Figure 11, on which the user may specify the number and type of articles to be cleaned by completing entry fields **1105**. In one embodiment of the invention, if necessary, the user may select the "More Selections" button **1110** to display additional menus of items to be cleaned. After the user has entered all of the articles to be cleaned, the user selects a "Continue" button **1115** to continue scheduling the order. Alternatively, the user may cancel the order by selecting a "Cancel" button **1120**.

After the user has entered the items to be picked up for cleaning, and has selected the "Continue" button **1115**, the system displays a pickup date scheduling screen **1200**. This scheduling screen **1200** allows the user to specify a date on which they would like the entered items to be picked up for cleaning. In a preferred embodiment of the invention, the user may specify this date using one or more drop-down menus **1205** – **1215**. Once the user enters the desired pickup date, they may proceed by selecting a "Continue" button **1220**. Alternatively, the user may cancel the order by selecting a "Cancel" button **1225**.

After the user has entered a requested pickup date and selected the "Continue" button **1220**, the system determines whether any time windows are available for the requested pickup day in the manner described above with regard to Step **915**. If one or more time windows is available for the requested pickup day, the system displays, on a pickup time window selection screen **1300**, one or more buttons **1305** that correspond to these time windows. The user may select one of the displayed time windows by selecting a button **1305** corresponding to the desired time window and then selecting a "continue" button **1310**.

If the system determines that no time windows are available for the requested pickup day, the system displays a screen that indicates that no time windows are available for the requested pickup day, and that provides the user with the option to cancel the order, or to specify a different pickup day. If the user chooses to specify a different pickup day, the system again displays the pickup date scheduling screen **1200**, which is described above.

In addition to displaying one or more time windows that are available for the pickup, the pickup time window selection screen **1300** also includes a "Cancel" **1315**

button that allows the user to exit the pickup time window selection screen **1300** without selecting one of the displayed time windows. In one embodiment of the invention, in response to the user selecting the "Cancel" button **1315**, the system displays a pickup transition screen **1400**, in which the system presents the user with one or more buttons **1405 – 1415** that correspond to various options as to how to proceed. More particularly, the pickup screen preferably includes a "Cancel Order" button **1405**, a "Specify Another Day for the Pickup" button **1410**, and a "Return to View Available Pickup Times" button **1415**. If the user selects the "Cancel Order" button **1405**, the system cancels the order and returns to the delivery service's main menu. If the user selects the "Specify Another Day for the Pickup" button **1410**, the system returns the user to the pickup date scheduling screen **1200**, where it allows the user to specify another date for the pickup. If the user selects the "Return to View Available Pickup Times" button **1415**, the system returns to the pickup time window selection screen **1300**, where it again displays the available time windows for the specified pickup day.

Once the user selects a button corresponding to a particular time window for the requested pickup day and selects the "Continue" button **1310**, the system displays a delivery date scheduling screen **1500**. This scheduling screen allows the user to specify a date on which they would like the cleaned items to be delivered (e.g., back to the user's home) after the items have been cleaned. In a preferred embodiment of the invention, the user may specify the delivery date using one or more drop-down menus, such as drop-down menus **1505 – 1515**, which are shown in Figure 15. Once the user enters the desired delivery date, they may proceed by selecting a "Continue" button **1520**. Alternatively, the user may cancel the order by selecting a "Cancel" button **1525**.

After a user has entered a requested delivery date and selected the "Continue" button **1520**, the system determines whether there is sufficient processing time between the time window selected for the delivery and any time window within the requested delivery day. The system preferably makes this determination as described in regard to Step **950**, above. If the system determines that there is not sufficient processing time between the time window selected for the pickup and any time window on the requested delivery day, the system displays a screen (not shown) that informs the user that the

delivery may not be scheduled for the requested delivery day, and that provides the user with the option to cancel the order, or to specify a different delivery day. If the user chooses to specify a different day for the delivery, the system again displays the delivery date scheduling screen **1300** to facilitate allowing the user to select a different day for the delivery.

If the system determines that there is sufficient processing time between the time window selected for the pickup and any time window on the requested delivery day, the system uses the techniques described above in regard to Step **960** to determine whether any time windows are available for the requested delivery day. If one or more time windows are available for the requested delivery day, the system displays these time windows on a delivery time window selection screen **1600**. The user may select one of these time windows by first selecting a button **1605 - 1615** that corresponds to the desired time window and then selecting a "continue" button **1620**.

If the system determines that no time windows are available for the requested delivery day, the system displays a screen that indicates that no time windows are available for the requested delivery day, and that provides the user with the option to cancel the order, or to specify a different delivery day. If the user chooses to specify a different delivery day, the system again displays the delivery date scheduling screen **1200**, which is described above, and allows the user to specify a different delivery date.

In addition, the delivery time window selection screen **1600** also includes a "Cancel" button **1625** that allows the user to exit the delivery time window selection screen **1600** without selecting one of the displayed time windows. In one embodiment of the invention, in response to the user selecting the "Cancel" button **1625**, the system displays a delivery transition screen **1700**, on which the system presents the user with various buttons **1705 – 1715** that correspond to options on how to proceed. More particularly, the delivery transition screen **1700** preferably includes a "Cancel Order" button **1705**, a "Specify Another Day for the Delivery" button **1710**, and a "Return to View Available Delivery Times" button **1715**. If the user selects the "Cancel Order" button **1705**, the system cancels the order and returns to the delivery service's main menu. If the user selects the "Specify Another Day for the Delivery" button **1710**, the system

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returns the user to the delivery date scheduling screen **1500**, where it allows the user to specify another date for the delivery. If the user selects the "Return to View Available Delivery Times" button, the system returns to the delivery time window selection screen **1600**, where it again displays the available time windows for the specified pickup day.

Once a user selects a button corresponding to a delivery time window **1605 – 1615** on the delivery time window scheduling screen **1600** and then selects the "continue" button **1620**, the system schedules both the pickup and the delivery to be made as specified by the user. In a preferred embodiment of the invention, the system "firmly" schedules the requested pickup and the requested delivery.

As will be understood by one skilled in the relevant field, while the example above describes a particular implementation of the invention within the context of a dry cleaning service, the invention has wide variety of applications to other fields. For example, the system may be used by a repair service to schedule the pickup of items to be repaired, and the delivery of the items back to the customer once the items are repaired. As another example, the system may be used by a pet grooming service to schedule the pickup of a pet to be groomed, and to schedule the delivery of the pet back to the customer once the pet has been properly groomed.

The system may also be used to schedule the occurrence of events other than pickups or deliveries. For example, in the embodiments described above, the system may be used to schedule re-occurring "customer visits" rather than delivery vehicle visits. As noted above, the term "customer visit" refers to a visit that is made to a customer to perform a service. Such a service may include, for example, a service (such as maintenance work or installation work) to be performed at the customer's residence. Such services may also include work that needs to be performed according to a periodic schedule, such as lawn service work or pool cleaning.

As will also be understood by one skilled in the relevant field, while the example above describes an implementation of the invention in which the user schedules a pickup from the user's home, and a delivery back to the user's home, the system may also be configured to schedule a pickup from a first address and a delivery to a second address that is different from the first address. This may be useful, for example, in a situation in

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which the user wants to have her laundry picked up from their home, and delivered, after cleaning, to their place of business.

An additional aspect of the invention that will be understood by one skilled in the relevant field is that, while the example above describes an implementation of the invention in which the user schedules a pickup to be made before a related delivery, a system according to the invention may also be used to schedule a delivery to be made before a related pickup. Such an embodiment of the invention may be used, for example, by movie rental companies to allow their customers to schedule a delivery of a DVD to be made to the customer's home within a first time window, and also to schedule a time to have the DVD picked up from the user's home after the user has finished watching the movie.

Conclusion

Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.